UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

December 22, 2010

Mr. John T. Carlin, Vice President
R. E. Ginna Nuclear Power Plant, LLC
Constellation Energy Nuclear Group, LLC
1503 Lake Road
Ontario, New York 14519

SUBJECT: R. E. GINNA NUCLEAR POWER PLANT – NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000244/2010009

Dear Mr. Carlin:

On November 11, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your R.E. Ginna Nuclear Power Plant. The enclosed inspection report documents the inspection results, which were discussed on November 11, 2010, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. In conducting the inspection, the team examined the adequacy of selected components and operator actions to mitigate postulated transients, initiating events, and design basis accidents. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

This report documents two NRC-identified findings that were of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. However, because of the very low safety significance of the violations and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the R.E. Ginna Nuclear Power Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for the public inspection in the NRC Public Docket Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Lawrence T. Doerflein

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-244
License No. DPR-18

Enclosure: Inspection Report 05000244/2010009
w/Attachment: Supplemental Information

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for the public inspection in the NRC Public Docket Room or from the Publicly Available Records component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-244

License No.: DPR-18

Report No.: 05000244/2010009

Licensee: Constellation Energy Nuclear Group, LLC

Facility: R. E. Ginna Nuclear Power Plant, LLC

Location: Ontario, New York

Dates: October 18, 2010 – November 11, 2010

Inspectors: F. Arner, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader
J. Schoppy, Senior Reactor Inspector, DRS
M. Balazik, Reactor Inspector, DRS
A. Rao, Project Engineer, Division of Reactor Projects (DRP)
C. Baron, NRC Mechanical Contractor
S. Kobylarz, NRC Electrical Contractor

Approved by: Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000244/2010009; 10/18/2010 – 11/11/2010; R. E. Ginna Nuclear Power Plant, LLC (Ginna); Component Design Bases Inspection

The report covers the Component Design Bases Inspection conducted by a team of four NRC inspectors and two NRC contractors. Two findings of very low risk significance (Green) were identified, both of which were considered to be non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using NRC Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Cross-cutting aspects associated with findings are determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

NRC-Identified Findings

Cornerstone: Mitigating Systems

- Green: The team identified a finding of very low safety significance involving a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, Design Control. Specifically, Constellation had not verified the adequacy of their design with respect to the impact of the installed Amptector type LSG trip unit discriminator feature on breaker coordination. The discriminator circuit design had not been evaluated to ensure the 480V load center bus motor control center (MCC) feeder breakers would maintain coordination and be capable of maintaining power to downstream safety-related components in response to design basis events such as seismic or steam line break transients. Constellation entered the issue into their corrective action program to evaluate the adequacy of their design and ensure the feeder breakers remained operable.

  The finding was determined to be more than minor because the finding was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the 480V busses to respond to initiating events to prevent undesirable consequences. The team evaluated the finding in accordance with Inspection Manual Chapter (IMC) 0609, Significance Determination Process, Attachment 0609.04, Phase 1- Initial Screening and Characterization of Findings, Table 4a for the Mitigating Systems Cornerstone. The team determined the finding was of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. The team did not identify a cross-cutting aspect with this finding because this was an old design issue and therefore was not reflective of current performance. (Section 1R21.2.1.1)

- Green: The team identified a finding of very low safety significance involving a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, Design Control. Specifically, Constellation had not correctly translated residual heat removal (RHR) pump net positive suction head (NPSH) operating limits into emergency operating procedures. Emergency operating procedure ES-1.3, Transfer to Cold Leg Recirculation, included criteria for aligning the discharge of the RHR pump to the suction of the safety injection pump under post-accident sump recirculation conditions which had not been adequately analyzed for RHR pump NPSH. Constellation entered the issue into their corrective action program to address the inconsistency between the design analysis and procedure and performed a review to ensure the RHR pump remained operable with respect to NPSH margin.

  The finding was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, design control measures had not ensured consistency between the design analysis assumptions and the operating procedure to ensure adequate RHR pump NPSH margin when aligned to the safety injection (SI) pump during sump recirculation. The team evaluated the finding in accordance with IMC 0609, Significance Determination Process, Attachment 0609.04, Phase 1- Initial Screening and Characterization of Findings, Table 4a for the Mitigating Systems Cornerstone. The team determined the finding was of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. The team did not identify a cross-cutting aspect with this finding because it did not represent current performance. The discrepancy between the design analysis and procedure occurred outside of the timeframe which reflects current performance. (Section 1R21.2.1.2)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in the R. E. Ginna Nuclear Power Plant Probabilistic Safety Assessment and the U.S. Nuclear Regulatory Commission's (NRC) Standardized Plant Analysis Risk (SPAR) model. Additionally, the R.E. Ginna Significance Determination Process (SDP) Phase 2 Notebook (Revision 2.1a) was referenced in the selection of potential components and operator actions for review. In general, the selection process focused on components and operator actions that had a Risk Achievement Worth (RAW) factor greater than 1.3 or a Risk Reduction Worth (RRW) factor greater than 1.005. The components selected were located within both safety-related and non-safety related systems and included a variety of components such as pumps, breakers, transformers, and valves.

The team initially compiled a list of components and operator actions based on the risk factors previously mentioned. Additionally, the team reviewed the previous component design bases inspection report (05000244/2007006) and excluded those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 13 components, 4 operator actions, and 4 operating experience items. The team's evaluation of possible low design margin included consideration of original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. The assessment also included items such as failed performance test results, corrective action history, repeated maintenance, maintenance rule (a)(1) status, operability reviews for degraded conditions, NRC resident inspector insights, system health reports, and industry operating experience. Finally, consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins. The margin review of operator actions included complexity of the action, time to complete the action, and extent-of-training on the action.

The inspection performed by the team was conducted as outlined in NRC Inspection Procedure (IP) 71111.21. This inspection effort included walkdowns of selected components, interviews with operators, system engineers and design engineers, and reviews of associated design documents and calculations to assess the adequacy of the components to meet design basis, licensing basis, and risk-informed beyond design basis requirements. Summaries of the reviews performed for each component, operator action, and operating experience sample, and the specific inspection findings identified are discussed in the subsequent sections of this report. Documents reviewed for this inspection are listed in the Attachment.

.2 Results of Detailed Reviews

.2.1 Results of Detailed Component Reviews (13 samples)

.2.1.1 Station Service Transformer 16 (PXABSS016)

a. Inspection Scope

The team inspected station service transformer (SST) 16 to verify that it was capable of meeting its design basis requirements. The station service transformer is designed to provide the preferred power source to safety-related 480V Bus 16. The team reviewed load flow and short circuit current calculations to determine the design basis for maximum load and breaker interrupting duty, and the Bus 16 load center equipment vendor ratings for conformance with the design basis. The team also reviewed the coordination/protection calculation for the bus incoming line and motor control center (MCC) feeder breakers for design basis load flow conditions and breaker coordination. The team performed walkdowns to assess the material condition and to identify potential seismic II/I issues. The team reviewed SST 16 transformer cooling fan requirements and verified fan operation was in accordance with design requirements. The team also reviewed surveillance tests on the incoming line and MCC feeder breaker Amptector trip units to ensure test results were in accordance with design requirements. Finally, corrective action documents and system health reports were reviewed to verify deficiencies were appropriately identified and resolved, and that the SST was properly maintained.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, Design Control. Specifically, Constellation had not verified the adequacy of their design with respect to the impact of the installed Amptector type LSG (long, short & ground) trip unit discriminator feature on breaker coordination.

Description: The team determined that an Amptector discriminator trip feature was enabled on the startup service transformer Bus 16 and Bus 14 incoming lines and MCC feeder breakers. These 480V breakers with an LSG Amptector overcurrent protective device have an associated safety feature called a discriminator. The discriminator is designed such that when a breaker is carrying a minimal current load (nominally less than 3 percent of its current sensor tap), and a fault (overload condition) occurs of significant magnitude, the protective device will instantaneously trip the breaker open. However, when the current load is above the minimum value, the instantaneous trip is bypassed and the breaker will trip in accordance with its short time delay setpoint. The team noted that NRC Information Notice 92-29, Potential Breaker Miscoordination Caused By Instantaneous Trip Circuitry, had been issued to alert licensees to potential breaker miscoordination involving instantaneous trip circuitry. The licensee had reviewed this notice and determined that their design was acceptable. This was based on the determination that the applicable circuits had sufficient current load above that required to bypass the discriminator instantaneous trip feature, thereby assuring coordination would not be affected.

The team noted that the circuit breaker Amptector type LSG discriminator trip unit function had not been evaluated within design calculation DA-EE-104-07, 480V Coordination and Circuit Protection Study. The team was concerned that a lack of breaker coordination for instantaneous trip conditions could exist during an event such as a seismic or steam line break (SLB) where non-safety related equipment could fault with a concurrent postulated loss-of-offsite-power (LOOP) condition. For SLB events, UFSAR section 3.6.2.3.2.4 assumptions are offsite power to be unavailable if a trip of the turbine-generator system or reactor trip system is a direct consequence of the postulated piping failure. The LOOP would result in the loss of the minimum current flow which was relied on to bypass the discriminator circuit. The team noted that if non-safety related equipment became faulted due to the event, the MCC feeder breakers may trip when the 16 and 14 safety busses would be re-energized by their emergency diesel generators.

The team determined that the 480V breaker coordination study evaluated the circuit breaker with an Amptector type LSG trip unit (with a discriminator feature) on the feeder circuit to safety-related Class 1E MCC 'D'. The team noted that the breaker trip unit was required to provide coordination with downstream non-Class 1E MCC circuit breakers during fault conditions. In response to the team's concerns, Constellation reviewed the short circuit study and determined that the Bus 16 MCC feeder breaker Amptector trip unit was susceptible to instantaneously tripping after a LOOP condition, because sufficient short circuit current could exist for a fault on specific non-Class 1E MCC circuits. The team noted that a feeder breaker trip would complicate operator recovery actions because safety related loads would be lost while they would be attempting to respond to the initiating event.

Constellation entered the issue into their corrective action program (CAP) and performed an operability review. Constellation reviewed non-Class 1E circuits where sufficient fault current could exist to challenge breaker coordination with safety-related equipment. Their initial review determined that there was reasonable assurance that circuit failure in the applicable non-class 1E equipment would not occur due to postulated events such as seismic, steam line break, or loss-of-coolant accidents. This was due in part to the location of the equipment and existing circuit configurations. Constellation concluded that a fault of sufficient magnitude would not be present when the emergency diesel generator (EDG) breaker would close to re-energize the safety bus at the time when the discriminator circuits would not be bypassed due to the 10 second interim loss of power (current load). This review was performed for both busses (16 and 14). The team reviewed Constellation's evaluation and found their initial assessment to be reasonable.

<u>Analysis</u>: The team determined that the licensee's failure to adequately evaluate the Amptector's discriminator circuit function design for all postulated design basis conditions was a performance deficiency. The finding was determined to be more than minor because the finding was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring

the availability, reliability, and capability of the 480V busses (16 and 14) to respond to initiating events to prevent undesirable consequences.

Specifically, the discriminator circuit design had not been evaluated to ensure the 480V load center bus MCC feeder breakers would maintain coordination and be capable of maintaining power to downstream safety-related components in response to design basis events such as seismic, steam line break transients, or loss-of-coolant accidents (LOCAs). The team evaluated the finding in accordance with Inspection Manual Chapter (IMC) 0609, Significance Determination Process (SDP), Attachment 0609.04, Phase 1-Initial Screening and Characterization of Findings, Table 4a for the Mitigating Systems Cornerstone. The team determined the finding was of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability. The team did not identify a cross-cutting aspect with this finding because this was an old design issue and therefore was not reflective of current performance.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, Design Control, requires, in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Contrary to the above, as of November 9, 2010, the protective device coordination design for Amptector trip units with the discriminator instantaneous trip circuits had not been adequately verified under all postulated design conditions. Specifically, the design which included the discriminator circuit had not been evaluated to ensure the 480V load center bus MCC feeder breakers would maintain coordination and be capable of maintaining power to downstream safety-related components in response to design basis events such as seismic, steam line break conditions, or LOCAs. Because this finding was of very low safety significance, and it was entered into Constellation's CAP as CR 2010-7062, this violation is being treated as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy.
(NCV 05000244/2010009-01, Inadequate Evaluation of Breaker Coordination for Amptector Type LSG Trip Unit Discriminator Feature)

.2.1.2 Residual Heat Removal Pump (PAC01A)

a. Inspection Scope

The team inspected the 'A' residual heat removal (RHR) pump to verify that it was capable of meeting its design basis requirements. The team reviewed applicable portions of the UFSAR and drawings to identify the design basis requirements for the pump. The team reviewed calculations and surveillance test procedures to verify that the pump was capable of achieving design basis head/flow requirements during limiting design basis conditions and that test acceptance criteria were consistent with these requirements. The team reviewed the hydraulic calculations associated with system flowrate and pressure as well as net positive suction head (NPSH) margin for the pump to ensure that the required performance could be achieved.

The team interviewed design and system engineers to review the design and system functional requirements as well as historical test performance results. In addition, the team reviewed work orders and corrective action documents to identify failures or nonconforming issues, and to determine if deficiencies were being appropriately identified, evaluated, and corrected. Finally, the team performed a review of the emergency operating procedures (EOPs) associated with post-accident pump operation to ensure the capability of the component to perform as required under actual accident conditions.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, Design Control. Specifically, Constellation had not correctly translated RHR pump NPSH operating limits into the EOPs. The EOP ES-1.3, Transfer to Cold Leg Recirculation, Revision 44, included criteria for aligning the discharge of the RHR pump to the suction of the safety injection pump under post-accident sump recirculation conditions which had not been adequately analyzed for RHR pump NPSH.

Description: The team reviewed design analysis DA-ME-2005-085, NPSH for the Emergency Core Cooling System (ECCS) Pumps during Injection and Sump Recirculation, Revision 2. This design calculation included an evaluation of the minimum NPSH that would be available to an RHR pump while taking suction from the containment sump during post-accident operation. The conditions evaluated included the operating RHR pump being aligned to the suction of the operating safety injection pump(s). For this mode of operation the calculation concluded that the RHR pump NPSH margin would be acceptable based on the reactor coolant system pressure being at least 57 psig greater than the containment building pressure. The calculation stated that this design input was based on the EOP ES-1.3 criterion for entering this alignment. However, the team observed that ES-1.3 did not directly include this pressure criterion. The procedure referred to EOP Figure 19.0, High Head Safety Injection (SI) Required, to determine if RHR pump alignment to the SI pump was required. This figure was based on measured core exit temperature. The team questioned how Figure 19.0 related to the minimum reactor coolant system pressure criterion used in the calculation.

During their review of the team's concern, Constellation confirmed that Figure 19.0 was not correctly applied or consistent with engineering analysis assumptions for the determination of RHR NPSH margin when aligned in series with an SI pump. The measured core exit temperature values included in the figure would not ensure adequate available NPSH for the operating residual heat removal pump, assuming conservative design saturated conditions in the containment sump. Constellation personnel stated that the values included in Figure 19.0 were non-conservative by approximately 25 degrees Fahrenheit (°F), and determined that the reactor pressure corresponding to the Figure 19.0 values in the design calculation would result in a RHR pump NPSH deficit of approximately 1.8 feet. Constellation personnel stated that the RHR NPSH design basis analysis had been previously based on using a different EOP Figure, (Figure 5, RHR Injection), than the one that had been translated into the existing procedure ES 1.3, during an October 2006 revision.

The team was also concerned that the reactor coolant pressure could decrease below the 57 psid assumption with respect to containment pressure over the course of post accident pump operation, resulting in a reduction of available NPSH as the RHR pump flow increased. The team noted the current EOPs did not include any criterion for stopping the safety injection pumps once their suction supply was aligned to an operating RHR pump.

Constellation initiated Condition Report 2010-7084 on November 10, 2010, to evaluate this issue. The associated operability evaluation verified that the RHR pump would still be operable if the system was aligned as allowed by Figure 19.0. Constellation's technical evaluation analyzed several different break sizes and the corresponding reactor pressures and temperatures. The evaluation considered that containment accident pressure would reasonably exist above and beyond the required containment pressure necessary to ensure adequate NPSH margin for the RHR pump. The evaluation took credit for less than 1 psig of containment accident pressure under post accident conditions and considered that the sump temperature would be expected to decrease over the course of the event. The team reviewed the operability evaluation and determined Constellation's conclusion was reasonable.

Analysis: The team determined that the failure to correctly translate RHR pump NPSH operating limits into the EOPs was a performance deficiency. The finding was determined to be more than minor because it was similar to example 3.j. of NRC IMC 0612, Appendix E, Examples of Minor Issues, in that based on design (saturated) conditions the team had a reasonable doubt of operability with respect to the NPSH margin for the RHR pumps until additional analysis was performed. Additionally, the finding was associated with the Mitigating Systems Cornerstone attribute of design control and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, design control measures had not ensured consistency between the design analysis assumptions and the operating procedure to ensure adequate RHR NPSH when aligned to the SI pump during sump recirculation. The team evaluated the finding in accordance with IMC 0609, Significance Determination Process, Attachment 0609.04, Phase 1- Initial Screening and Characterization of Findings, Table 4a for the Mitigating Systems Cornerstone. The team determined the finding was of very low safety significance because it was a design deficiency confirmed not to result in a loss of operability.

The team did not identify a cross-cutting aspect with this finding because it did not represent current performance. The discrepancy between the design analysis and procedure occurred outside of the timeframe which reflects current performance.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, Design Control, requires, in part, that measures be established to ensure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, from October 27, 2006, to November 9, 2010, the design conditions assumed within calculation DA-ME-2005-085 to evaluate the adequacy of RHR NPSH during sump recirculation, had not been correctly translated into procedure ES-1.3. Because this finding was of very low safety significance, and it was entered into Constellation's CAP as Condition Report 2010-7084, this violation is being treated as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000244/2010009-02, Inadequate Translation of NPSH Design Limits into EOPs)**

.2.1.3 Component Cooling Water Pump (PAC02A)

a. Inspection Scope

The team inspected the 'A' component cooling water (CCW) pump to verify that it was capable of meeting its design basis requirements. The CCW system is designed to provide cooling water to essential components under normal, transient, and accident conditions. The team reviewed the UFSAR, drawings, and procedures to identify the most limiting requirements for the pump. The team reviewed a sample of surveillance test results to verify that pump performance met the acceptance criteria and that the criteria were consistent with the design basis. The team also reviewed calculations for NPSH to ensure that the pump could successfully operate under the most limiting conditions. The team discussed the design, operation, and corrective maintenance of the pump with engineering staff to gain an understanding of the performance history and overall component health. Additionally, the team reviewed corrective action documents and performed a walkdown to assess the material condition of the pump.

b. Findings

No findings were identified.

.2.1.4 Charging Pump (PCH01A)

a. Inspection Scope

The team inspected the 'A' charging pump to verify that it was capable of meeting its design basis requirements. The charging system is designed to provide injection to the reactor coolant system under normal, transient, and accident conditions. The team reviewed the UFSAR, drawings, and procedures to identify the most limiting requirements for the pump. The team reviewed a sample of surveillance test results to verify that pump performance met the acceptance criteria and that the criteria were consistent with the design basis. The team reviewed calculations for NPSH to ensure that the pump could successfully operate under the most limiting conditions, including a loss of component cooling water to the non-regenerative heat exchanger. The team discussed the design, operation, and corrective maintenance of the pump with engineering staff to gain an understanding of the performance history and overall component health. The team also reviewed corrective action documents and performed a walkdown to assess the material condition of the pump. In addition, the team reviewed the primary and back-up sources of electrical power and instrument air required to operate the pump.

b. Findings

No findings were identified.

.2.1.5 Component Cooling Water Motor Operated Valve (MOV-738A)

a. Inspection Scope

The team inspected the CCW to RHR heat exchanger motor operated valve (MOV), MOV-738A, to verify that it was capable of performing its design function. The team reviewed the UFSAR, calculations, and procedures to identify the design basis requirements of the valve. The team also reviewed accident system alignments to determine if component operation would be consistent with the design and licensing bases assumptions. Valve testing procedures and valve specifications were also reviewed to ensure consistency with design basis requirements. The team reviewed periodic verification diagnostic test results and stroke test documentation to verify acceptance criteria were met and consistent with the design basis. Additionally, the team verified the valve safety function was maintained in accordance with Generic Letter (GL) 89-10 guidance by reviewing torque switch settings, performance capability, and design margins. The team reviewed degraded voltage conditions and voltage drop calculations to confirm that the MOV would have sufficient voltage and power available to perform its safety function at worst case degraded voltage conditions.

The team interviewed the MOV program engineer to gain an understanding of maintenance issues and overall reliability of the valve. The team conducted a walkdown to assess the material condition of the valve, and to verify the installed valve configuration was consistent with design basis assumptions and plant drawings. Finally, corrective action documents were reviewed to verify that deficiencies were appropriately identified and resolved, and that the valve was properly maintained.

b. Findings

No findings were identified.

.2.1.6 Safety Injection Motor Operated Valve (MOV-857C)

a. Inspection Scope

The team inspected the safety injection (SI) pump suction valve from RHR, MOV-857C, to verify that it was capable of performing its design function. The team reviewed the UFSAR, calculations, and procedures to identify the design basis requirements of the valve. The team also reviewed accident system alignments to determine if component operation would be consistent with the design and licensing bases assumptions. Valve testing procedures and valve specifications were also reviewed to ensure consistency with design basis requirements. The team reviewed periodic verification diagnostic test results and stroke test documentation to verify acceptance criteria were met and consistent with the design basis. Additionally, the team verified the valve safety function was maintained in accordance with GL 89-10 guidance by reviewing torque switch settings, performance capability, and design margins. The team also reviewed degraded voltage conditions and voltage drop calculations to confirm that the MOV would have sufficient voltage and power available to perform its safety function at worst case degraded voltage conditions.

The team interviewed the MOV program engineer to gain an understanding of maintenance issues and overall reliability of the valve. The team conducted a walkdown to assess the material condition of the valve, and to verify the installed valve configuration was consistent with design basis assumptions and plant drawings. Corrective action documents were reviewed to verify that deficiencies were appropriately identified and resolved and that the valve was properly maintained. In addition, the team performed a review of the valve interlock design and testing to ensure that the valve and other associated emergency core cooling system (ECCS) valves would function as designed under the most limiting design basis condition, including a single failure of a valve or power supply.

b. Findings

No findings were identified.

.2.1.7 Emergency Diesel Generator (KDG01B)

a. Inspection Scope

The team inspected the 'B' emergency diesel generator to verify that it was capable of meeting its design basis requirements. The design function of the 'B' EDG is to provide standby power to safety-related 480V busses 16 and 17 when the preferred power supply is not available. The team reviewed the EDG loading study to ensure consistency with actual loading expected in response to a design basis accident. The team reviewed the break horsepower basis for selected pump motors to ensure loads were adequately considered in the loading study at conservative motor conditions.

The team reviewed completed Technical Specification (TS) performance tests to ensure the EDG met all applicable test acceptance criteria. The team reviewed applicable procedures associated with the use of ultra-low sulfur diesel (ULSD) and bio-diesel fuels to ensure that the correct fuel was being used. The EDG fuel consumption and unusable volume calculations were reviewed to assess the capacity of the fuel oil storage and day tanks and to verify the capability of the EDG to operate for the required mission time. The team reviewed calculations to assess the fuel oil storage tank protection against external events such as a postulated tornado event. The fuel oil monitoring limits were reviewed to assess fuel oil quality to ensure test results were consistent with design specifications. The team reviewed the design and supporting calculations of the EDG air start system and the jacket water and lube oil cooling systems to ensure the EDG was capable of performing in accordance with its design basis.

In addition, the team reviewed engineering change package (ECP) 2008-0040, that involved switching from continuous service water (SW) flow through the heat exchangers to isolation of the SW flow using two normally closed, parallel configured, air operated valves (AOV) that open on an EDG start signal. The team verified that the AOV's fail in the open position to ensure EDG cooling capability was maintained on loss of power or air to the AOVs. In addition, the team performed interviews with the EDG system engineer, reviewed applicable corrective action documents, and performed an extensive walk-down of the 'B' EDG and associated support equipment to assess the material condition and potential vulnerability to hazards such as flooding.

b. Findings

No findings were identified.

.2.1.8 Service Water Pump Discharge Check Valve (CV-4602)

a. Inspection Scope

The team inspected the 'B' service water pump discharge nozzle check valve, CV-4602, to verify that it was capable of meeting its design basis requirements. The check valve was designed to minimize SW coolant loss from the system as a result of an idle or out of service pump to ensure safety related loads are cooled. The team reviewed the UFSAR, drawings, and procedures to identify the design basis requirements of the check valve. The check valve testing procedures and SW system hydraulic analyses were reviewed to verify the design basis requirements were appropriately incorporated into the test acceptance criteria. The team reviewed a sample of test results to verify the acceptance criteria were met. The team reviewed the corrective and preventive maintenance of the check valve to gain an understanding of the performance history and overall component health. In addition, the team reviewed maintenance pictures of the check valve to assess material condition. Finally, corrective action documents and system health reports were reviewed to verify deficiencies were appropriately identified and resolved, and that the check valve was properly maintained.

b. Findings

No findings were identified.

.2.1.9 Pressurizer Relief Valve (RV-434)

a. Inspection Scope

The team inspected pressurizer safety relief valve, RV-434, to verify it was capable of performing its design basis function. The team reviewed the UFSAR, TSs, drawings, and procedures to identify the design basis requirements of the valve. The team verified that the valve setpoint was in accordance with TS requirements and the American Society of Mechanical Engineers (ASME) operating and maintenance code. The team reviewed design documentation for sizing and the lift setpoint, and the analysis for overpressure protection capability of the valve to determine if the valve would meet design requirements. The team also discussed valve performance and trending with the system engineer, and reviewed condition reports and system health reports to assess the material condition of the valve.

b. Findings

No findings were identified.

.2.1.10 Motor Driven Auxiliary Feedwater (MDAFW) Flow Control Valve (MOV-4007)

a. Inspection Scope

The team inspected the 'A' MDAFW pump flow control valve, MOV-4007, to verify that the valve was capable of supporting the pump design basis flow requirements to the steam generator. The team reviewed the UFSAR, drawings, and procedures to identify the design basis requirements of the valve. Design calculations and system operating parameters were reviewed to verify that the design basis had been appropriately translated into specifications and procedures. The team reviewed test procedures to verify that acceptance criteria for the tested parameters were appropriately supported by calculations to ensure the design and licensing bases were satisfied. The team verified instrument control loop settings to ensure the design function of the MDAFW pump was supported. The team verified that the thermal overload bypass circuitry was appropriately tested to ensure MOV operation during a design basis event. The team interviewed the MOV program engineer to review maintenance issues and assess overall reliability of the valve. The team also conducted a walkdown to assess the material condition of the valve and to verify the installed valve configuration was consistent with design basis assumptions and plant drawings. Finally, corrective action documents, preventive maintenance, and system health reports were reviewed to verify that deficiencies were appropriately identified and resolved.

b. Findings

No findings were identified.

.2.1.11 Station Auxiliary Transformer (12-PXYD012A)

a. Inspection Scope

The team inspected the 12A station auxiliary transformer (SAT) to verify that it was capable of meeting its design basis requirements. The 12A SAT was designed to provide offsite power to 4160V busses 12A and 12B. The team reviewed one line diagrams, the transformer nameplate, and vendor test results for impedance data to confirm that correct transformer impedances were used in electrical analyses. The team confirmed the adequacy of the overcurrent relay settings for design basis loading requirements. Additionally, the team reviewed transformer dissolved gas analysis results, transformer bushing condition monitoring, and the transformer and auxiliary's preventive maintenance condition monitoring for adverse conditions that could affect reliability. The team performed a walkdown of the 12A SAT to assess the observable material condition. Finally, corrective action documents and system health reports were reviewed to verify deficiencies were appropriately identified and resolved and the SAT was properly maintained.

b. Findings

No findings were identified.

.2.1.12 Tie Breaker for Bus 14 to Bus 13 (52/BT14-13)

a. Inspection Scope

The team inspected the Bus14 to Bus 13 tie-breaker to verify that it was capable of meeting its design basis requirements. The breaker was designed to tie Bus 14 to Bus 13 when allowed by plant conditions. The team reviewed one line diagrams and vendor equipment data to confirm the breaker ratings were sufficient to meet design basis conditions. The team reviewed the electrical analyses for load flow, short circuit, and breaker trip unit coordination requirements to confirm the adequacy of the settings for bus tie operation. The team reviewed operating and preventive maintenance procedures for conformance with design basis load conditions and breaker trip unit setting requirements. Finally, condition reports and system health reports were reviewed to verify deficiencies were appropriately identified and resolved.

b. Findings

No findings were identified.

.2.1.13 4160 Volt Switchgear (Bus 12A)

a. Inspection Scope

The team inspected the 4kV switchgear Bus 12A to verify that it was capable of meeting its design basis requirements. Bus 12A was designed to distribute preferred power to safety-related 480V busses 14 and 18. The team reviewed load flow and short circuit current calculations for maximum load, momentary and interrupting duty, and bus bracing requirement to ensure conformance with the design basis. The team confirmed the use of maximum switchyard voltage for short circuit calculations and reviewed vendor equipment data for adequate margin in breaker momentary and interrupting duty. The team confirmed the calculated minimum voltage (for degraded grid conditions) and short circuit current (for maximum switchyard voltage) were based on switchyard operating limits. The team reviewed preventive maintenance for selected breakers, component replacements, and the results of inspections/tests to confirm the reliability of the equipment. The team performed a walkdown of the 4kV switchgear to assess the observable material condition and to identify potential seismic II/I issues. Finally, condition reports and system health reports were reviewed to verify deficiencies were appropriately identified and resolved.

b. Findings

No findings were identified.

.2.2 Review of Low Margin Operator Actions (4 samples)

The team assessed manual operator actions and selected a sample of four operator actions for detailed review based upon risk significance, time urgency, and factors affecting the likelihood of human error. The operator actions were selected from a probabilistic risk assessment (PRA) ranking of operator action importance based on RAW and RRW values. The non-PRA considerations in the selection process included the following factors:

- Margin between the time needed to complete the actions and the time available prior to adverse reactor consequences;
- Complexity of the actions;
- Reliability and/or redundancy of components associated with the actions;
- Extent of actions to be performed outside of the control room;
- Procedural guidance to the operators; and
- Amount of relevant operator training conducted.

.2.2.1 Letdown Isolation Following a Loss of Component Cooling Water

a. Inspection Scope

The team evaluated the manual operator actions to isolate reactor letdown flow within 10 minutes following a loss of CCW to preclude a common mode failure of the charging pumps due to elevated volume control tank (VCT) temperature. The loss of charging flow to the reactor coolant pump (RCP) seals, concurrent with the loss of CCW cooling to the RCP thermal barriers, increases the likelihood of a RCP seal loss-of-coolant accident (LOCA). Operator critical tasks included:

- Recognize loss of CCW, enter abnormal procedure
- Trip the reactor
- Trip both RCPs
- Isolate letdown by closing AOV-427

The team interviewed licensed operators and operator simulator instructors and reviewed associated operating procedures and operator training, including associated Operations Night Orders, to evaluate the operators' ability to perform the required actions. The team walked down applicable control and indicating panels in the simulator and in the main control room to assess the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Constellation's operating procedures and risk assumptions. The team also reviewed equipment deficiency reports, and performed independent infield observations, to assess the material condition of the CCW pumps, motors, heat exchangers, and support systems. In addition, the team reviewed the VCT heat-up analysis for a loss of CCW, including design and operating assumptions, to ensure that it used appropriate and conservative inputs. The team evaluated the available process margins, based on fluid flow rates, temperatures, and heat transfer capacities, and performed independent calculations to verify the reasonableness of engineering analysis supporting the prescribed operator actions.

b. Findings

No findings were identified.

.2.2.2 Isolate Break in Service Water Common Discharge Piping in the Auxiliary Building

a. Inspection Scope

The team evaluated operator actions to recognize and mitigate a service water (SW) pipe break in the common discharge line within the auxiliary building. Specifically, operator critical tasks included:

- Recognize condition
- Direct response in accordance with alarm response procedure
- Determine cause
- Confirm flooding
- Isolate source

The team interviewed licensed and non-licensed operators, reviewed associated alarm response procedures and operator training, and conducted a detailed walkdown of accessible portions of the auxiliary building with an auxiliary operator (AO) to assess the operators' ability to perform the required actions and the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Constellation's alarm response procedures and risk assumptions. The team reviewed equipment deficiency reports, maintenance history, internal flood analyses, and inspection results and performed independent in-field observations to assess potential internal flood vulnerabilities and to ensure that Constellation maintained appropriate configuration control of critical design features. In addition, the team independently walked down accessible portions of the auxiliary building to assess the material condition of the associated structures, systems and components (SSCs) with particular focus on potential high volume internal flood sources.

b. Findings

No findings were identified.

.2.2.3 Align and Start Standby Auxiliary Feedwater Pumps

a. Inspection Scope

The team evaluated the manual operator actions to align and start the standby auxiliary feedwater (SAFW) pumps given a failure of the main and auxiliary feedwater (AFW) sources. Specifically, operator critical tasks included:

- Recognize loss of feedwater flow, enter abnormal procedure (FR-H.1)
- Transition to EOP Attachment 5.1 (SAFW alignment)
- Ensure safety injection (SI) reset
- Ensure normally open valves are open
- Open SAFW pump C(D) suction valve MOV-9629A(B)
- Verify at least one SW pump running
- Align discharge valves as directed to feed desired steam generator A(B)
- Start SAFW pumps as directed by FR-H.1

The team interviewed licensed operators and operator simulator instructors, reviewed associated alarm response procedures and operator training, and observed a licensed operator respond to a simulated demand to align and start the SAFW pumps from the main control room to independently assess the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Constellation's alarm response procedures and risk assumptions. The team reviewed SAFW valve and breaker verification surveillances, pump testing results, and equipment deficiency reports to assess the SAFW system availability and reliability. The team also walked down accessible portions of the SAFW and AFW systems to independently assess Constellation's configuration control and the material condition of these risk significant SSCs.

b. Findings

No findings were identified.

.2.2.4 Align the Technical Support Center Battery Charger to DC Train A or B

a. Inspection Scope

The team evaluated the manual operator actions to align the technical support center (TSC) battery charger to DC train A or B, given a loss of a single train of 480 VAC power which would eventually fail the associated battery chargers. Specifically, operator critical tasks included:

- Enter abnormal procedure in response to low voltage condition on DC train A/B
- Remove TSC battery from equalizing charge
- Open AC input breaker to TSC charger, verify TSC battery voltage, close AC input breaker
- Proceed to A(B) battery room, unlock and close disconnect panel switch

- Proceed to TSC battery room and ensure fuse disconnect switch is closed
- Proceed to turbine building basement, unlock and close manual throw-over switch

The team interviewed licensed and non-licensed operators, reviewed associated operating procedures and operator training, and observed an AO perform a simulated transfer of DC train B to the TSC battery charger to independently assess the AO's ability to perform the required actions and the likelihood of cognitive or execution errors. The team evaluated the available time margins to perform the actions to verify the reasonableness of Constellation's operating procedures and risk assumptions. The team also walked down the associated battery rooms, battery chargers, switching panels, and essential main control room instrumentation to independently assess Constellation's configuration control and the material condition of the associated SSCs.

b. Findings

No findings were identified.

.2.3 Review of Industry Operating Experience and Generic Issues (4 samples)

.2.3.1 Operating Experience Smart Sample FY 2007-02: Flooding Vulnerabilities Due to Inadequate Design and Conduit/Hydrostatic Seal Barrier Concerns

a. Inspection Scope

NRC Operating Experience Smart Sample (OpESS) FY 2007-02 is directly related to NRC Information Notice (IN) 2005-30, "Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design," and issues associated with conduit/hydrostatic seal issues. The team evaluated internal and external flood protection measures for the EDG rooms, battery rooms, turbine building basement, auxiliary building, and SW screenhouse. The team walked down the areas to assess operational readiness of various features in place to protect redundant safety-related components and vital electric power systems from flooding. These features included equipment drains, door seals, backflow check valves, flood detection and alarms, flood barriers, circulating water (CW) pump trip sensors, and wall penetration seals.

The team conducted several detailed walkdowns of the turbine, EDG, screenhouse, and auxiliary buildings to assess potential flood vulnerabilities. In addition, the team conducted a step-by-step walkthrough of two time-critical flood mitigation strategies with an AO to independently assess procedure quality, flood barrier material condition, and the operators' ability to perform the required actions. The team also reviewed engineering evaluations, calculations, alarm response procedures, preventive and corrective maintenance history, operator training, and correct action condition reports associated with flood protection equipment and measures. Finally, the team interviewed Constellation personnel regarding their knowledge of indications, procedures, and required actions associated with several postulated internal and external flood scenarios.

b. Findings

No findings were identified.

.2.3.2 Operating Experience Smart Sample FY 2008-01 - Negative Trend and Recurring Events Involving Emergency Diesel Generators

a. Inspection Scope

NRC OpESS FY 2008-01 is directly related to NRC Information Notice (IN) 2007-27, "Recurring Events Involving Emergency Diesel Generator Operability." The team reviewed Constellation's evaluation of IN 2007-27 and their associated corrective actions. The team reviewed Constellation's EDG system health and walkdown reports, EDG condition reports and work orders, leakage monitoring, and surveillance test results to verify that Constellation appropriately dispositioned EDG deficiencies. Additionally, the team independently walked down both EDGs on several occasions to inspect for indications of vibration-induced degradation on EDG piping and tubing and for any type of leakage (air, fuel oil, lube oil, jacket water). The team performed a post-surveillance run walkdown of the 'A' EDG on November 3, 2010, to ensure Constellation maintained appropriate configuration control and identified deficiencies at a low threshold. Additionally, the team directly observed portions of the biennial maintenance work performed on the 'B' EDG to assess the material condition of the EDG and its support systems.

b. Findings

No findings were identified.

.2.3.3 NRC Information Notice 98-02: Nuclear Power Plant Cold Weather Problems and Protective Measures

a. Inspection Scope

NRC IN 98-02 discussed the potential common-cause failure mechanisms of safety related systems and systems important to safety caused by extreme cold weather conditions. The team reviewed Constellation's evaluation of IN 98-02. The team reviewed the disposition of the information notice and conducted walkdowns of areas exposed to cold conditions. This included accompanying Constellation operations personnel on a walkdown of equipment required to protect components during winter conditions. The team also reviewed the results of periodic walkdowns by operations personnel and reviewed a sample of corrective actions generated as a result of those walkdowns to assess whether issues were appropriately identified and prioritized.

b. Findings

No findings were identified.

.2.3.4 NRC Information Notice 89-44: Hydrogen Storage On The Roof of The Control Room

a. Inspection Scope

NRC IN 89-44 discussed potential generic problems pertaining to the storage of hydrogen in the vicinity of safety-related structures and air pathways into safety-related structures. Hydrogen is used on pressurized water reactor (PWR) plants for providing a cover gas in the volume control tank and for cooling the main turbine generator. The team reviewed the licensee's evaluation and disposition of the IN. The team reviewed the licensee's applicable procedures for hydrogen storage and makeup and performed walkdowns to assess the adequacy of the hydrogen storage methods.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

The team reviewed a sample of problems that Constellation had previously identified and entered into their CAP. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, the team reviewed condition reports written on issues identified during the inspection to verify adequate problem identification and incorporation of the problem into the CAP. The specific corrective action documents that were sampled and reviewed by the team are listed in the Attachment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

The team presented the inspection results to Mr. J. Carlin, Site Vice President, and other members of Constellation's staff at an exit meeting on November 11, 2010. The team reviewed proprietary information, which was returned to Constellation at the end of the inspection. The team verified that none of the information in this report is proprietary.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Constellation Personnel
D. Crowley, EDG System Engineer
J. Jackson, Senior Licensing Engineer
D. Peters, Motor Operated Valve Engineer
R. Reissner, Senior Reactor Operator
K. Reynolds, Supervisor, Electrical Design Engineering
M. Zweigle, Supervisor, Mechanical Design Engineering

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000244/2010009-01	NCV	Inadequate Evaluation of Breaker Coordination for Amptector Type LSG Trip Unit Discriminator Feature (1R21.2.1.1)
05000244/2010009-02	NCV	Inadequate Translation of NPSH Design Limits into EOPs (1R21.2.1.2)

LIST OF DOCUMENTS REVIEWED

Audits and Self-Assessments
LTR-0236-0048-01, NRC CDBI Summary of MPR Independent Self Assessment, dated 4/21/10

Calculations
07-060, CCW and ECCS Model Conversion from KY Pipe to PROTO-FLO and System Analysis, Rev. B
90170-C-10, Weak Link Assessment – 738A and 738B, Rev. 2
CN-CRA-04-76, Ginna Steamline Break Mass/Energy Release Inside Containment for EPU, Rev. 1
CN-TA-04-63, Westinghouse Calculation for Extended Power Uprate Program, Rev. 1
CN-TA-05-11, Ginna Loss of Load/Turbine Trip Analysis for the Extended Power Uprate Program, Rev. 2
DA-EE-2000-025, EDG Day Tank Total Loop Uncertainty, Rev. 3
DA-EE-92-043-21, Instrument Loop Performance Evaluation and Setpoint Verification for AFW F2001, Rev. 1
DA-EE-92-120-01, Design Analysis EDG B Steady Station Loading, Rev. 5
DA-EE-92-131-06, AC Motor Operated Valve Degraded Voltages, Rev. 16
DA-EE-93-104-07, 480V Coordination and Circuit Protection Study, Rev. 7
DA-EE-93-107-07, 4kV Overcurrent Relays Coordination and Circuit Protection Study, Rev. 5
DA-EE-96-068-03, Offsite Power Load Flow Study, Rev. 5
DA-ME-96-040, Weak Link Analysis for Valves 4007 and 4008, Rev. 0

DA-ME-97-045, Service Water System Hydraulic Model, Rev. 1
DA-ME-97-066, Hydraulic Analysis for Single CCW Pump Operation and Maximum Flow, Rev. 0
DA-ME-97-102, Weak Link Assessment MOVs 4007 and 4008, Rev. 2
DA-ME-98-012, MOV Thrust Limit Calculation for MOV 738A, Rev. 3
DA-ME-98-026, MOV Thrust Limit Calculation for MOV 857C, Rev. 3
DA-ME-98-042, MOV Thrust Limit Calculation for MOV 4007, Rev. 6
DA-ME-98-123, Weak Link Assessment MOV 857C, Rev. 0
DA-ME-98-129, Service Water Pump Inlet Strainer Performance Evaluation, Rev. 0
DA-ME-98-138, EDG Lube Oil and Jacket Water Heat Exchanger Plugging Limits and Thermal Performance at Limiting SW Flow, Rev. 1
DA-ME-2005-085, NPSH for ECCS Pumps during Injection and Sump Recirculation, Rev. 2
DA-96-098-03, AC Electrical System Fault Analysis, Rev. 4
DA-2002-049, CCW Parallel Path Pump Operation Low Flow Setpoint, Rev. 0
EWR4526-ME-23, Diesel Generator Fuel Oil Storage Tank Usable Volume, Rev. 1
ITT-121736-1, EDG Jacket Water Cooler Heat Transfer Calculation, Rev.0
ITT-121736-2, EDG Lube Oil Cooler Heat Transfer Calculation, Rev. 0
KC-ME-91-0011, Diesel Fuel Oil Minimum Onsite Storage Requirements, Rev. 3
93C2769-C-017, CVCS Holdup Tanks, Rev. 0
DA-EE-96-005-07, Motor Control Center Coordination Analysis, Rev. 14

Corrective Action Reports (CRs)

1998-0026	2009-1200	2010-6478*	2010-6894*	2010-6977
2004-1404	2009-2727	2010-6496*	2010-6896*	2010-6980*
2006-1564	2009-4054	2010-6528*	2010-6898*	2010-6982*
2006-3998	2009-5574	2010-6529*	2010-6903	2010-6984*
2006-4394	2009-7407	2010-6530*	2010-6911*	2010-7026
2007-0073	2009-7880	2010-6532*	2010-6913	2010-7036*
2007-2039	2009-7987	2010-6538*	2010-6914*	2010-7046*
2007-2851	2009-8372	2010-6541*	2010-6917*	2010-7062*
2007-5723	2009-8722	2010-6549*	2010-6918	2010-7063*
2007-5998	2009-9178	2010-6550*	2010-6919*	2010-7064*
2007-8269	2010-0385	2010-6551*	2010-6929*	2010-7065
2008-4356	2010-2334*	2010-6554*	2010-6930*	2010-7084*
2008-7315	2010-3157	2010-6562*	2010-6936*	2010-7086*
2008-9118	2010-3325	2010-6563*	2010-6939*	2010-7087*
2008-9947	2010-3326	2010-6565*	2010-6941*	2010-7096*
2009-0785	2010-4030	2010-6568*	2010-6955	2010-7113*
2009-0871	2010-5670	2010-6575*	2010-6957*	
2009-1198	2010-6033	2010-6707*	2010-6967	
2009-1199	2010-6464	2010-6875*	2010-6976*	

* CR written as a result of this inspection

Design & Licensing Basis Documents
G1-IF-001, Ginna PRA Internal Flooding Analysis Notebook (Excluding HRA and Quantification) Owner Acceptance, dated 2/2/09

NUREG-0821, Integrated Plant Safety Assessment Systematic Evaluation Program R. E. Ginna Nuclear Power Plant, December 1982
RG005110, NRC Letter to RG&E Corp., "Integrated Plant Safety Assessment Report (IPSAR) Section 4.5, Plant Flooding by Deer Creek - R. E. Ginna Nuclear Power Plant," dated 8/19/83
RG009806, NRC Letter to RG&E Corp., "SEP Topic III-5.B – Pipe Break Outside Containment," dated 6/24/80
TS-203-044594-G5, Technical Specifications for Doors and Door Frames Ginna Station, dated 5/24/78

Drawings

03200-0198 Sh. 1, Diesel Generator A Heat Trace Panel ACPDPDG01 Schedule, Rev. 2
03200-0199 Sh. 1, Diesel Generator B Heat Trace Panel ACPDPDG02 Schedule, Rev. 2
10904-478, Transformer, ASL-R&ASL Wiring Diagram, Rev. 1
10905-47, Circulating Water Pumps Aux Trip Elementary Wiring Diagram, Rev. 6
10905-0147, DG A & B Vault Sump Pumps Elementary Wiring Diagram, Rev. 11
10905-0551, Sh. 1, Elementary Wiring Diagram SI Bypass System MCC C Aux. Panel, Rev. 5
10905-0614, MOV-857C Elementary Wiring Diagram, Rev. 4
10905-0659, Elementary Wiring Diagram MDAFW Pump A Discharge Valve MOV-4007, Rev. 5
10910-011B, Feed to Bus 16 Supply Breaker from Station Service Transformer 16, Rev. 1
10911-0224, MOV-4616 Connection Diagram, Rev. 3
10911-0238, MOV-738A Connection Diagram, Rev. 3
10911-0258, MOV-4615 Connection Diagram, Rev. 3
11252-1, Relay Setting Schedule, Rev. 2
11302-0238, CCW Surge Tank Level, Rev. 4
11310-0120, MOV-738A Connection Diagram, Rev. 2
11310-0146, MOV-857C Connection Diagram, Rev. 3
21946-0031A, Circulating Water Pump A Control Schematic, Rev. 11
21946-0031B, Circulating Water Pump B Control Schematic, Rev. 10
21946-0071A, Charging Pump A, Rev. 4
21946-0072A, Component Cooling Water Pump A, Rev. 1
21946-0078A, Residual Heat Removal Pump A, Rev. 5
21946-0614, MOV-857C, Rev. 3
33013-146, Discharge Pipe Profile and Installation, Rev. E
33013-0652, 480V One Line Wiring Diagram, Rev. 26
33013-1236 Sh. 2, Feedwater (FW) P&ID, Rev. 17
33013-1237, Auxiliary Feedwater (FW) P&ID, Rev. 57
33013-1238, Standby Auxiliary Feedwater (FW) P&ID, Rev. 26
33013-1239 Sh. 1, Diesel Generator - A (DG) P&ID, Rev. 25
33013-1239 Sh. 2, Diesel Generator - B (DG) P&ID, Rev. 22
33013-1245, Component Cooling Water, Rev. 32
33013-1246 Sh 1, Component Cooling Water, Rev. 15
33013-1246 Sh 2, Component Cooling Water, Rev. 12
33013-1247, Residual Heat Removal, Rev. 44
33013-1265 Sh. 1, Chemical and Volume Control System Charging (CVCS) P&ID, Rev. 11
33013-2144, Plant Arrangement Screen House Roof Plan & Sections, Rev. 3
33013-2238, 12A Transformer Access Wiring Diagram, Rev. 2
33013-2539, AC System Plant Load Distribution One Line Diagram, Rev. 23

33013-2630 Sh. 3, Service Water System Return Buried Piping Isometric, Rev. 0
33013-2681, Sump Pumps, Drains, and Sewage Pumps P&ID, Rev. 11
96702, Valve, 14"-150 ANSI DRV-B Model Nozzle Check Valve, Rev. 1
C-304-700, SW Return Aux. Bldg. to Catch Basin, Rev. 5
D-201-016, Electrical Emergency Diesel Generator Vaults, Rev. 5
D-215-013, Electrical Conduit Layout Diesel Generator Rooms & Lube Oil Storage Room, Rev. 9
D-215-161, Electrical Emergency Diesel Generators Power Duct Run, Rev. 7
D-304-201, Circulating Water Plan & Elevation, Rev. 3
D-403-081, Turbine Area Foundations Circulating Water Tunnel-Inside Plant Plan & Sections, Rev. 3
D-981-506, Floor & Equipment Drains Standby Aux. FW, Rev. 1
HE-6, Feedwater High Energy System, Rev. 3
HE-7, Main Steam High Energy System, Rev. 5

Engineering Evaluations
3596ME-3, Evaluation of Steam Piping in the Diesel Generator Room, Rev. 0
CCN-2007-0030, Calculation Change to SW Strainer Fouling Limit, Rev. 0
CR 2007-5998, Apparent Cause Evaluation, dated 10/19/07
CR 2009-7987, Functionality Assessment, dated 10/20/09
DBCOR 2004-0031, R.E. Ginna Safety Analysis Input Assumptions for EPU, dated 10/3/04
ECN 2009-0034, MOV Thrust Limit Calculation for MOV 4007, Rev. 6
ECN 2009-0036, Modify NSL-5080-0002 to Document the Design Bases DP of 4007 and 4008, Rev. 13
ECN 2009-0085, Update Instrument Loop Performance Evaluation and Setpoint Verification, Rev. 1
ECP 2009-0043, Past Operability Assessment of MOV-4007 and MOV-4008, Rev. 0
ECP-2007-0119, Replacement of EDG Lube Oil and Jacket Water Heat Exchanger Tube Bundles, Rev. 0
ECP-2008-0040, Installation of Two AOVs to Isolate Flow to the EDG Cooler Flow, Rev. 0
EWR 3990-CE1, DGB Modifications Design Analysis, dated 11/4/88
EWR 4136, 'A' Diesel Generator Emergency Local Control Panel Safety Analysis, dated 10/13/86
G1-HR-0001, PRA Human Reliability (HR) Analysis Notebook, Rev. 1
G1-IF-0000, PRA Internal Flooding (IF) Analysis Notebook, Rev. 0
G1-QU-0000, PRA Quantification (QU) Notebook, Rev. 0
MPR-3084, Evaluation of Internal and External Flooding at R.E. Ginna Nuclear Power Plant, July 2007
NSL-5080-0002, Design Analysis R.E. Ginna Station Generic Letter 89-10 MOVs, Rev. 13
PCR 2004-0081, GE Betz Water Treatment System, dated 1/10/06
TCH09A, CVCS Hold-up Tank A Screening Evaluation Worksheet (SEWS), dated 1/22/97
TCH09B, CVCS Hold-up Tank B Screening Evaluation Worksheet (SEWS), dated 1/22/97
TCH09C, CVCS Hold-up Tank C Screening Evaluation Worksheet (SEWS), dated 12/18/96
TSR 2000-173, Diesel Generator Space Heater Circuits, dated 10/18/02
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CENG-GNPP-ISI-005, Fifth Ten-Year Inservice Inspection Plan, Rev. 1

ECP-2009-0232 PRC Review Package, Protect Charging Pumps on Loss of Component Cooling Water, Rev. 0

EE-58, Installation, Calibration, and Test Specification Amptector Solid State Overcurrent Devices on Type DB Circuit Breakers, Rev. 3

EWR 4225, Overcurrent Protection Upgrade on DB Breakers, Rev. 1

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LRCK-Stone-Outdoor License Renewal Aging Management Checklist, Rev. 0

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SY.08, PRA Service Water (SW) System Notebook, Rev. 0

SY.09, PRA Component Cooling (CC) System Notebook, Rev. 0

SY.61, PRA Alternating Current (AC) Power System Notebook, Rev. 0

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NRC Information Notice 92-29: Potential Breaker Miscoordination caused by Instantaneous Trip Circuitry, dated 4/17/92

NRC Information Notice 92-69: Water Leakage from Yard Area through Conduits into Buildings, dated 9/22/92

NRC Information Notice 94-27: Facility Operating Concerns Resulting from Local Area Flooding, dated 3/31/94

NRC Information Notice 98-02: Frozen Lines, dated 9/27/79

NRC Information Notice 2005-11: Internal Flooding/Spray-down of Safety-related Equipment Due to Unsealed Equipment Hatch Floor Plugs And/or Blocked Floor Drains, dated 5/6/05

NRC Information Notice 2005-30: Safe Shutdown Potentially Challenged by Unanalyzed Internal Flooding Events and Inadequate Design, dated 11/7/05

NRC Information Notice 2007-01: Recent Operating Experience Concerning Hydrostatic Barriers, dated 1/31/07

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AP-CCW.2, Loss of CCW During Power Operation, Rev. 22

AP-SW.1, Service Water Leak, Rev. 22

AP-SW.2, Loss of Service Water, Rev. 8
AR-A-3, STDBY Aux FW Cond Stor Tank HI/Low Level, Rev. 7
AR-A-4, STDBY Aux FW HVAC Trouble, Rev. 5
AR-A-5, STDBY Aux FW Pump C or D Trip, Rev. 7
AR-A-7, RCP A CCW Return HI Temp or LO Flow 165 GPM 125°F, Rev. 8
AR-A-8, RCP A Seal Water Inlet HI Temp 150°F, Rev. 7
AR-A-12, Non-Regen HX Letdown Out HI Temp 145°F, Rev. 9
AR-A-18, VCT HI Temp 145°F, Rev. 7
AR-A-21, Comp Cooling HX Out HI Temp 100°F, Rev. 9
AR-A-22, CCW Pump Discharge LO Press 60 PSI, Rev. 12
AR-A-27, STDBY Aux FW Pump C DISCH HI Press 1365 PSI, Rev. 7
AR-B-1, RCP 1A # 1 Seal Out HI Temp 200°F, Rev. 10
AR-B-17, RCP 1A No. 1Seal HI-LO Flow 5.0 GPM 1.0 GPM, Rev. 12
AR-DG-B-9, Jacket Water Temperature, Rev. 6
AR-DG-B-11, Lube Oil Temperature, Rev. 7
AR-H-6, CCW Service Water LO Flow 1000 GPM, Rev. 11
AR-I-1, Screen House Lo Level 22', Rev. 11
AR-I-9, Screen House Lo-Lo Level 19', Rev. 12
AR-J-7, 480V Main or Tie Breaker Trip, Rev. 10
AR-L-9, Aux Bldg HI Level, Rev. 4
AR-L-10, Aux Bldg Sump Pump Auto Start, Rev. 6
CME-48-02 Bus 16, Low Voltage Metal Enclosed Switchgear Bus 16, Rev. 10
CME-50-02-52/BT1413, 480V Air Circuit Breaker, Type DB-50, Rev. 1
CNG-OP-1.01-2001, Communications and Briefings, Rev. 2
ECA-1.3, Response to Sump B Blockage, Rev. 1
EOP ATT-2.2, Attachment SW Isolation, Rev. 9
EOP ATT-2.5, Attachment Split SW Headers, Rev. 1
EOP ATT-5.1, Attachment SAFW, Rev. 1
EOP ATT-22.0, Attachment Restoring Feed Flow, Rev. 5
EOP ATT-24.0, Attachment Transfer Battery to TSC, Rev. 2
EOP E-0, Reactor Trip or Safety Injection, Rev. 42
EOP FIG-6.0, Figure MIN RCS Injection, Rev. 0 & Rev. 1
ER-AFW.1, Alternate Water Supply to the AFW Pumps, Rev. 32
ER-D/G.2, Alternate Cooling for Emergency D/Gs, Rev. 18
ER-ELEC.1, Restoration of Offsite Power, Rev. 18
ER-SC.2, High Water (Flood) Plan, Rev. 7
ER-SC.3, Low Screenhouse Water Level, Rev. 22
ER-SH.1, Response to Loss of Screenhouse, Rev. 2
ES-1.3, Transfer to Cold Leg Recirculation, Rev. 43
FIG-19.0, Figure High Head SI Required, Rev. 1
FR-H.1, Response to Loss of Secondary Heat Sink, Rev. 39
MET-049, Equipment Specification for Pressurizer Safety Valve Set Pressure Testing, Rev. 11
O-1.2, Plant Startup from Hot Shutdown to Full Load, Rev. 192
O-6.11, Surveillance Requirement/Routine Operations Check Sheet, Rev. 160
S-3.2, Charging and Volume Control, Rev. 19
S-8A, Component Cooling Water System Startup and Normal Operation Valve Alignment, Rev. 52
O-22, Cold Weather Walkdown Procedure, Rev. 6

STP-O-2.2QA, Residual Heat Removal Pump A Inservice Test, Revision 5
STP-O-2.8Q, Component Cooling Water Pump Quarterly Test, Revision 5
STP-O-4, Residual Heat Removal Low Pressure Piping Inspection, Rev. 0
STP-O-4.1, Residual Heat Removal High Pressure Piping Inspection, Rev. 0
STP-O-39, Leakage Evaluation of Primary Coolant Sources Outside Containment, Rev. 1
STP-O-R-1.1, Valve Interlock Verification – Residual Heat Removal System, Rev. 1
T-36.2, Service Water Redundant Return Line Operation, Rev. 18

Tests, Inspections, and Examinations
S24, Diagnostic Test Data for MOV-4007, performed 2/6/09
STP-O-2.2, Diesel Generator Load and Safeguard Sequence Test, performed 9/16/09
STP-O-2.5.7, Emergency Diesel Generator Air Operated Valves, performed 8/25/10 & 9/2/10
STP-O-2.10.11, Exercising Service Water Redundant Discharge Line Isolation Valves, performed 9/30/09
STP-O-12.2, Emergency Diesel Generator B, performed 9/19/10
STP-O-14, Circulating Water Pumps - High Water Trip Logic, performed 9/13/09
STP-O-14.1, Circulating Water Pumps Relay Verification, performed 9/16/09
STP-O-16-COMP-A, Auxiliary Feedwater Pump A Comprehensive Test, performed 8/4/10
STP-O-30.5, Standby Auxiliary Feedwater Pumps Valves and Breakers, performed 9/14/10
STP-O-36-COMP-C, Standby Auxiliary Feedwater Pump C - Comprehensive Test, performed 11/18/09
STP-O-36-COMP-D, Standby Auxiliary Feedwater Pump D - Comprehensive Test, performed 12/10/09
STP-O-36QC, Standby Auxiliary Feedwater Pump C - Quarterly, performed 8/19/10
STP-O-36Q-D, Standby Auxiliary Feedwater Pump D - Quarterly, performed 7/30/10
STP-O-R-25, Service Water System Flow Test, performed 9/28/09
02GM043, FW M3 Magnetic Particle Examination, performed 3/21/02
02GM052, MS L2 Magnetic Particle Examination, performed 3/21/02
02GP061, MS L2 Liquid Penetrant Examination, performed 3/21/02
02GRT195, MS L2 Radiographic Examination, performed 4/4/02
02GU096, FW M3 UT Pipe Weld Examination, performed 3/21/02
02GV548, FW M3 Visual Examination of Welds, performed 3/20/02
02GV549, MS L2 Visual Examination of Welds, performed 3/20/02
M-92.2, Inservice Inspection of Miscellaneous Water Control Structures at Ginna, performed 5/24/10
M-95, Annual Inspection and Operational Check of Backflow Protection System, performed 8/13/09
Report on ECAD Testing at the Ginna Nuclear Power Plant, dated April 2005, October 2006, September 2008, and May 2010
SC-3.17, Auxiliary Building Flood Barrier Installation/Removal/Inspection (Annual), performed 5/10/10
SC-3.17, Auxiliary Building Flood Barrier Installation/Removal/Inspection (Quarterly), performed 2/9/10
Sump Pump Actuation Testing, performed 11/5/10
T55299-1, Wyle Test Report for PRV 434, performed 5/28/08

System Health, System Walkdowns, and Trending
Auxiliary Feedwater System (AFS) System Health Report, dated 4/1/10 - 6/30/10
Circulating Water System Expansion Joint PM History Tracking Datasheet
Diesel Generator Emergency Power System Health Report, 2nd Quarter 2010
EDG Fuel Analysis Trend, dated 3/10/09 - 9/14/10
EDG Lube Oil Analysis Trend, dated 4/3/09 - 9/3/10
Reactor Coolant System Health Report, 2nd Quarter 2010
Service Water System (SWS) System Health Report, dated 4/1/10 - 6/30/10

Training Documents
LOR-LP-10-02-03, PRA EOP-AP Review, Rev. 0
LOR-LP-10-02-04, PRA Review and Top 10 Actions, Rev. 0
LOR-LP-10-02-05, Gas Intrusion in Safety Systems, Rev. 0
LP No. R2801C, Component Cooling Water System, Rev. 18
LP No. R4201C, Auxiliary Feedwater System, Rev. 23
LP No. R5101C, Service Water System, Rev. 29
SEG-10-03-02, CCW Transient & Loss LTDN HX Cooling, Rev. 0
R0801C, Diesel Generator System Licensed Operator Training, Rev. 29
R4201C, Auxiliary Feedwater System Licensed Operator Training, Rev. 23
R5101C, Service Water System Licensed Operator Training, Rev. 27

Work Orders

C20401365	C20603862	C20801578	C20807437	C90681743
C20502496	C20705250	C20801632	C20807912	C90747684
C20500993	C20800871	C20803906	C90217710	C90781359
C20500994	C20800963	C20805625	C90636139	
C20603780	C20801557	C20806922	C90649244	

LIST OF ACRONYMS

AC	Alternating Current
AFW	Auxiliary Feedwater
AO	Auxiliary Operator
AOV	Air Operated Valves
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CW	Circulating Water
CCW	Component Cooling Water
DBD	Design Basis Documents
DGA	Dissolved Gas Analysis
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
ECP	Engineering Change Package
EDG	Emergency Diesel Generator
EOP	Emergency Operating Procedure
GL	Generic Letter

HELB	High Energy Line Break
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure
IPEEE	Individual Plant Examination for External Events
LOCA	Loss-of-Coolant Accident
LOOP	Loss-of-Offsite Power
LSG	Long, Short, & Ground
MCC	Motor Control Center
MDAFW	Motor Driven Auxiliary Feedwater
MOV	Motor Operated Valve
NCV	Non-Cited Violation
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
OpESS	Operating Experience Smart Sample
PM	Preventive Maintenance
PRA	Probabilistic Risk Assessment
PSA	Probabilistic Safety Assessment
PWR	Pressurized Water Reactor
RAW	Risk Achievement Worth
RCP	Reactor Coolant Pump
RHR	Residual Heat Removal
RRW	Risk Reduction Worth
SAFW	Standby Auxiliary Feedwater
SAT	Station Auxiliary Transformer
SBLOCA	Small Break Loss-of-Coolant Accident
SDP	Significance Determination Process
SI	Safety Injection
SPAR	Standardized Plant Analysis Risk
SRA	Senior Reactor Analyst
SSC	Structure, System, and Component
SST	Station Service Transformer
SW	Service Water
TS	Technical Specifications
TSC	Technical Support Center
UFSAR	Updated Final Safety Analysis Report
ULSD	Ultra-low Sulfur Diesel
VCT	Volume Control Tank